

## 8. Summary of Groundwater-Related Risks

To determine the potential health risks associated with contamination at hazardous waste sites, EPA conducts a risk assessment. EPA's risk assessment does not evaluate past exposures or existing health effects. Such exposures and health effects are evaluated by the Federal Agency for Toxic Substances and Disease Registry (ATSDR).

Currently, there is not an immediate *direct* risk from groundwater at the Joint Site because no one is currently drinking the contaminated groundwater and so there is no current exposure to groundwater contaminants. However, EPA's goal is to ensure that actual exposure of people to contaminated groundwater at the Joint Site does not occur. The remedy selected in this ROD is expected to take a minimum of 50 years, and may take significantly longer, to complete. Groundwater use is discussed in Section 7 of this ROD and in Section 2 of the JGWFS. Because there is the potential that contaminated groundwater could be used in the future, EPA's risk assessment evaluates what the risk *would be if* someone were to use the groundwater. Such a person could be exposed to contaminants by such activities as ingestion of the water, direct contact, or by inhalation of certain contaminants which volatilize out of the water during showering, toilet flushing, and clothes washing.

Two reports document the risks presuming use of groundwater at the Joint Site. The Joint Groundwater Risk Assessment (JGWRA) was completed by the responsible parties under EPA oversight, and the Supplement to the JGWRA was completed by EPA. Both documents calculate the hypothetical risk to a person who uses the groundwater from a given hydrostratigraphic unit, based on conditions which exist in groundwater today. When evaluating possible remedial actions, EPA typically relies on reasonable maximum exposure (RME) risks, including groundwater uses that result in ingestion, inhalation, and dermal contact. Risks from these pathways have been calculated for each hydrostratigraphic unit. The risk assessment did not focus solely on chlorobenzene, benzene, and TCE, though these do provide the vast majority of the total potential human health risk. Rather, all chemicals in groundwater were considered by the risk assessment documents.

### **8.1 Two Methods of Risk Characterization: Complexities in Assessing Groundwater Risks**

The potential risks (cancer and non-cancer) from Joint Site groundwater have been calculated for this proposed remedy by two methods. The first, used in the JGWRA, utilized a "*plume averaging*" approach in which it was assumed that the receptor was exposed to the average of concentrations measured in monitoring wells in a given hydrostratigraphic unit. The second

method, used in EPA's Supplement to the JGWRA, was to generate *risk contours*, which present a *spatial distribution of risk*. With contours, one can see how the risk to a person placing a single well would vary from point to point in any of the plumes; in effect, how the risk is distributed spatially within the plume.

Neither of these approaches is intended to supersede the other; rather, it is EPA's intention that they be used together to provide a better picture of overall risk for the Joint Site. This two-method approach is indicated due to complexities related to evaluating risks associated with groundwater.

Assessing risks associated with the use of groundwater as a medium is, by most accounts, complex. Among other reasons, this is because groundwater must be drawn from a well or wells before it is used. The concentration of contaminants in the water drawn from the ground (and correspondingly, the risk to an individual using the water) will depend on many factors, including the number of wells being used, the rate at which the water is pumped and the zone of hydraulic influence of the well(s), the depth or depths at which the well is screened to take in water, and changes in the groundwater concentrations over time at the location of the well(s).

To determine what the risk may be to an individual using groundwater, an estimate of the concentration of chemicals in the water that may be used by the individual must be derived. The factors just mentioned complicate the ability to calculate a concentration term that will uniquely represent the exposure to any hypothetical individual. The exact area of groundwater to which a person would be exposed via a well or wells can be difficult to define, and adequate data are not always available for sophisticated risk-based calculations. As with most areas of the field of risk assessment, simplifying assumptions must be made, and these must be acknowledged when interpreting risk calculations.

The description of these methods, and a statement as to the relative drawbacks and benefits of each, is provided in the JGWRA, the Supplement to the JGWRA, and in Section 3 of the JGWFS. The following provides a brief summary of the reasons that EPA supplemented the calculations performed by the plume-averaging approach with risk contours. The JGWRA calculated the concentration term for any given contaminant as the average of concentrations for all wells within the hydrostratigraphic unit for which a risk was being calculated. When used alone, this introduces the following uncertainties and issues:

1. The monitoring wells for the calculation were not installed for the purpose of determining the true average concentration of contaminants in the groundwater, but to determine the extent of the contamination. The result is that the average of concentrations found in all wells is not truly the average concentration in the contaminant distribution;

2. If a person were to use water from a well in the affected groundwater, it is unlikely that their well would produce water with a concentration equal to the average concentration in the overall distribution, unless they were receiving water from a large number of wells within the contaminated area and water was being blended prior to service;
3. Because a single risk value is used to represent the plume, the value cannot reflect information about the spatial distribution of risk within the contaminant distribution in groundwater;
4. The plume-averaging approach cannot take into account the extent of the contaminated area, so that a very large area at medium concentration is computed as having a higher risk than a tiny area at high concentration; and
5. The number of wells used in the calculation varied from hydrostratigraphic unit to unit and the number of wells sampled varied from contaminant to contaminant within each unit.

These issues are more thoroughly discussed in the Supplement to the JGWRA (Section 1).

To mitigate some of these issues with plume-averaged risk, risk contours were developed in the Supplement to the JGWRA. Risk contours are derived from concentration contours, which are interpolated lines of equal concentration derived from sampling results at multiple well points. Each point on the contour is based on an assessment of concentrations at all wells around it. A concentration of a contaminant in groundwater, given an exposure scenario, implies a certain hypothetical risk that can be calculated. Therefore, the continuous spatial distribution of chemical concentrations in groundwater, represented by concentration contours, can be directly translated into a continuous distribution of risk, represented by risk contours. The values of the risk contours for all contaminants can be added to obtain a distribution of total risk within a given hydrostratigraphic unit. By finding the location of a hypothetical future well on such a total risk contour map, one can read an *estimate* of the risk associated with using water from that location, and see how that risk might differ from the risk at any other location in the contaminant distribution.

Risk contouring does not generate a single risk value, but rather a risk distribution that allows one to see the range of risks over the contaminant distribution and to see spatially which areas of the distribution may present particularly high risk or low risk, relative to the other areas. It should be noted that because a given location on a risk contour accounts not only for the concentration from the nearest well but for all wells surrounding that point, risk contouring does not represent “single-point” risk assessment but takes into account all groundwater data available for the Joint Site.

Risk contouring also has uncertainties, including uncertainty in the interpolation to determine contour lines, uncertainty as to the movement of contaminants over time, and uncertainty that the concentration found in monitoring wells would be the same at a production well. However, it is noted that the last two forms of uncertainty also exist for the plume-averaging approach.

The Supplement to the JGWRA produced risk contour sets for the RME exposure scenario in the UBF, MBFB Sand, MBFC Sand, and Gage Aquifer. Because of the small size of the contaminant distribution in the Lynwood Aquifer, it was decided that a risk based on plume-averaged concentrations in this hydrostratigraphic unit would be sufficient and that a risk contour for the Lynwood Aquifer would not add significant value. The JGWRA produced risks based on plume-averaged concentrations as the basis for exposure terms for the MBFB Sand, the MBFC Sand, the Gage Aquifer, and the Lynwood Aquifer, with the exception of the chlorobenzene plume, for which a plume-averaged risk was not computed for the MBFB Sand. EPA did compute a risk contour for this unit, however.

## **8.2 Summary of Factors for Toxicity Assessment and Exposure Assessment**

Cancer potency factors (CPFs) have been developed by EPA's National Center for Exposure Assessment (NCEA) for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of milligram per kilogram per day ( $\text{mg/kg/day}$ )<sup>-1</sup>, are multiplied by the estimated intake of a carcinogen in  $\text{mg/kg/day}$ , to provide an upper bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied to account for the use of animal data to predict effects on humans.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects (chemicals may exhibit both carcinogenic and noncarcinogenic effects, in which case EPA accounts for both effects in the risk assessment). RfDs, which are expressed in units of  $\text{mg/kg/day}$ , are chemical-specific estimates of exposure levels at which noncancer effects would not be expected to occur. Estimated intakes from environmental media can then be compared to the RfD. The ratio of the actual intake to the RfD for a chemical is called the *hazard index* for that chemical. RfDs are derived from human epidemiological studies or animal studies to which safety factors have been applied. These safety factors ensure that the RfDs will not underestimate the potential for noncancer effects to occur.

Of the primary and most prevalent contaminants in groundwater at the Joint Site, benzene, TCE, and PCE are considered potential human carcinogens. Chlorobenzene is not considered a potential human carcinogen but does pose a significant non-cancer risk. The reader should consult the JGWRA for more detailed information on the cancer and noncancer effects of other chemicals in groundwater at the Joint Site.

Both the JGWRA and the Supplement to the JGWRA used the same toxicity and exposure assumptions. However, the JGWRA, utilizing solely the approach of plume-averaging, calculated “average” and “industrial” scenarios of risk as well as the RME scenario. The Supplement, calculating risk contours, provided estimates using only the RME scenario. In the JGWRA, the “average” scenario did not assume upper bound but rather average values for exposure parameters, including concentration. The “industrial scenario” assumed that only workers were exposed during a normal work day. It is noted that the industrial scenario in the JGWRA does *not* represent the risk that would be incurred by a worker using groundwater from directly under the former Montrose or Del Amo plants. Rather, because it uses the average concentration of all wells in the contaminant distribution, it simulates an “average” risk to workers who might use groundwater throughout the entire contaminant distribution. Workers at the former Montrose and Del Amo facilities would experience much higher risks than those represented in the industrial scenario in the JGWRA if they used groundwater from directly under the properties, because the concentrations of contaminants at these locations are at the heart of the distribution, and are extremely high.

The JGWRA and its Supplement considered hypothetical risks from groundwater use at the site by three pathways, including ingestion, inhalation, and dermal contact. The inhalation pathway included activities such as showering, toilet flushing, clothes washing, etc.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g.  $10^{-6}$ ). An excess lifetime cancer risk of  $1 \times 10^{-6}$  would indicate that, as a plausible upper bound, an individual has a one in one million excess chance of developing cancer as a result of exposure to the contaminants that are the subject of the risk assessment, over a 70-year lifetime under the specific exposure conditions at the site. There are exceptions from site to site, but EPA generally takes remedial actions when the site-related excess cancer risks exceed  $10^{-4}$  and may take action when the site related excess cancer risks are between  $10^{-6}$  and  $10^{-4}$ .

For noncancer risks, the total hazard index for the site is obtained by adding the hazard indices for all contaminants under all pathways. Total hazard indices exceeding unity (1) indicate the possibility for noncancer effects due to the environmental exposures being analyzed in the risk assessment.

### **8.3 Summary of Risks**

Table 8-1 provides a summary of the plume-averaged risks (cancer and noncancer) for the Joint Site by hydrostratigraphic unit. Tables 8-2 and 8-3 provide more detailed breakdowns of the risk at the Joint Site, as calculated by the plume averaging method. These tables breakdown risks by pathway and by plume. Figures 8-1a through 8-1h show the combined risk contours for the Joint Site.

The result of the risk assessment is that the risks from the Joint Site, should anyone use the groundwater, are extremely high. Risks calculated by the plume-averaging method are as much as 12,000 times what EPA would consider a safe concentration for potable use and are above acceptable levels in all of the affected hydrostratigraphic units. Risks at the center of the plumes, calculated by either method, are as much as 100,000 times greater than EPA's point of departure guideline of one in a million excess lifetime cancer risk ( $10^{-6}$ ) and between 10,000 and 100,000 times greater than the acceptable non-cancer hazard index of 1. Users of water within the Joint Site are not exposed to this contamination presently and such risks would only be realized if the water at the Joint Site were used, either at locations presently affected or after the contamination has spread further.

### **8.4 Risk Status of para-Chlorobenzene Sulfonic Acid (pCBSA)**

pCBSA is a unique by-product of the DDT manufacturing process and is present in high concentrations up to 110,000 ppb downgradient of the Montrose facility at the Joint Site (in the NAPL area directly under the former Montrose plant, concentrations of pCBSA reach 1,100,000 ppb.) pCBSA occurs in all aquifers in which chlorobenzene occurs, and covers a wider lateral area of the aquifers than does chlorobenzene (See discussion in Section 7 of this ROD, Section 2 of the JGWFS, and in the Montrose RI Report, cited in the list in Section 4 of this ROD).

There are no promulgated health-based standards for pCBSA, and there are no accepted toxicological values (slope factor, risk reference dose (RfD), dose-response relationships, etc.) for this compound. In addition, there are no acceptable surrogate compounds upon which to base toxicological values for pCBSA. There are no chronic studies and a few limited acute studies of the toxicity of pCBSA in animals. The few and limited short-term studies, taken alone, provided no indication of mutagenic or teratogenic health effects and suggested that gavage dosages could be raised above 1000 mg/kg/day without observable toxic effects. In addition, another study indicated that another chemical was converted into pCBSA by the body in order to excrete it: pCBSA has a high water solubility. This *may* mean that pCBSA residence time in the human body is short compared to other chemicals at the Joint Site. These factors would suggest a low toxicity. However, the design of the studies performed had definite limitations, and more short-term studies would be needed to confirm these results. More

importantly, no chronic (long term) studies have been done on pCBSA. Therefore, these results are not definitive and cannot be used to quantify the risk associated with pCBSA. In turn, EPA believes there are insufficient data upon which to establish provisional standards for pCBSA. Based on one sub-chronic non-cancer study, the State of California has established with respect to the Joint Site a non-promulgated and provisional No Observed Adverse Effect Level (NOEL) of 1 mg/kg/day for pCBSA, that would approximately translate to a provisional drinking water standard of 25,000 ppb.

EPA intends to monitor any future toxicological studies on pCBSA, however no studies currently are planned. EPA will ensure that the persons making decisions on prioritization of toxicological studies are aware of the presence and nature of pCBSA at the Joint Site.

## **8.5 Basis for Action**

The principal threat for this action, as discussed earlier in this ROD is the NAPL. This NAPL continually and slowly dissolves in the groundwater in any hydrostratigraphic unit in which it is present, creating a distribution of dissolved phase contamination. Also, the NAPL *itself* may move to greater depths.

Through dissolution, the NAPL gives rise to a large distribution of dissolved phase contamination in the groundwater at concentrations in excess of health-based standards. Dissolved contamination may arrive to deeper units either by: (1) dissolved contamination migrating downward from/through the shallower units, or (2) NAPL migrating directly to the deeper unit followed by direct dissolution into the deeper unit. Dissolved contamination also moves outward laterally in most of the affected units. Because of the large extent of existing contamination, and this potential for migration, this contaminated water may eventually be used by persons, may migrate and reach existing wells that are being used for groundwater or reach locations that are the site for future wells, and destroy the usability of the groundwater resource.

This section showed that the health risk posed by the contaminated groundwater at the Joint Site is unacceptable, should the groundwater be used. While the contaminated groundwater at the Joint Site is not being used presently, EPA considered that:

- The groundwater would pose an extreme risk if it were ever used (exceeding  $10^{-2}$  cancer risk and hazard indices in excess of 10,000);
- The groundwater is classified by the State of California as having a potential beneficial use which includes use as drinking water;
- The laws and policies of the State of California are generally focused on protecting potential future beneficial uses of groundwater, even where it is not currently used;
- The NCP requires that EPA consider the potential future uses of groundwater;
- The groundwater is contaminated over a very large area both laterally (covering several square miles) and vertically (covering six hydrostratigraphic units to depths exceeding 200 feet);
- The groundwater contamination may continue to move either as a result of a direct or indirect movement of NAPL or as a result of continued dissolved phase contamination;



- The contamination may move from aquifers or areas which are not presently utilized for drinking water to aquifers or areas which are utilized for drinking water. Protection is necessary for the heavily used Silverado Aquifer which underlies the present extent of contamination at the Joint Site;
- While adjudication may limit the installation of new wells, it does not preclude such installations in the future;
- The groundwater would likely be used to some degree if it were not contaminated, as evidenced by the presence of some wells in the area and plans by cities to install more wells; and

Because of these factors, the risks posed, and the principal threats discussed, EPA considers the groundwater at the Joint Site actionable.

**Table 8-1**  
**Summary of Cancer and Non-Cancer Groundwater-Related Risks**  
**by the Plume Averaging Method**

Record of Decision for Dual Site Groundwater Operable Unit  
Montrose Chemical and Del Amo Superfund Sites

	Cancer Risk		Non-Cancer Hazard Index	
	Chlorobenzene Plume	Benzene Plume	Chlorobenzene Plume	Benzene Plume
<b>MBFB Sand</b>	Calculated Only By Risk Contours Method	$3 \times 10^{-1}$	Calculated Only By Risk Contour Method	12,724
<b>MBFC Sand</b>	$7 \times 10^{-4}$	$1.3 \times 10^{-1}$	178	9,839
<b>Gage Aquifer</b>	$1 \times 10^{-5}$	*	50	*
<b>Lynwood Aquifer</b>	N/A†	N/A‡	7.2	N/A‡

\* The benzene in the Gage Aquifer is in the chlorobenzene plume

† N/A - Not applicable because chlorobenzene is not a carcinogen and other carcinogens are not in the Lynwood

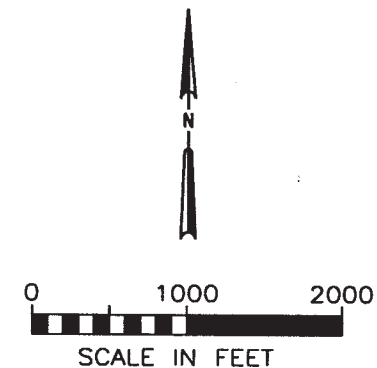
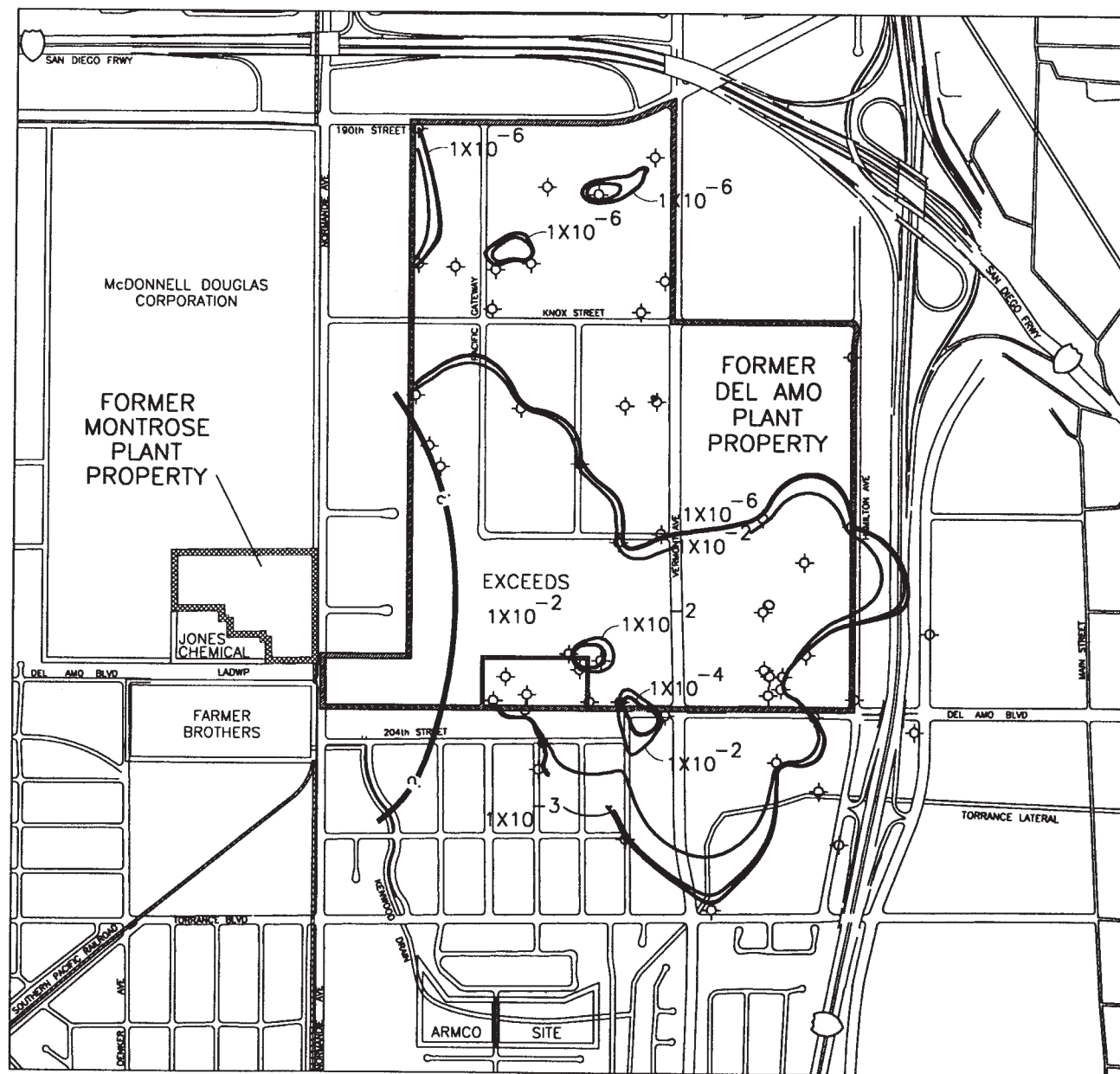
‡ N/A - Not applicable because there is no benzene plume in the Lynwood Aquifer

**Table 8-2**  
**Future Residential Use of Hypothetical Groundwater Well**  
**RME Hazard Index**  
**Risk Calculated by Plume-averaging Method**  
Record of Decision  
Dual Site Groundwater Operable Unit  
Montrose Chemical and Del Amo Superfund Sites

CHEMICAL	BELLFLOWER B-SAND Benzene	BELLFLOWER C-SAND		GAGE AQUIFER Chlorobenzene	LYNWOOD AQUIFER Chlorobenzene
		Benzene	Chlorobenzene		
<i>Dermal Contact with Tap Water</i>					
Total DDT	NA	0.003	0.046	0.0019	NA
Total BHC	NA	0.00055	0.0089	NA	NA
Acetone	NA	0.0017	0.0010	0.000077	NA
Benzene	600	250	0.074	0.02	NA
sec-Butylbenzene	6	NA	NA	NA	NA
Carbon tetrachloride	NA	0.48	0.095	NA	NA
Chlorobenzene	0.05	0.063	1.4	0.44	0.064
Chloroform	0.2	0.2	0.040	NA	NA
1,4-Dichlorobenzene	NA	0.0083	0.0010	NA	NA
1,1-Dichloroethane	0.004	NA	NA	NA	NA
1,2-Dichloroethane	0.03	NA	NA	NA	NA
1,1-Dichloroethene	0.03	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.02	NA	NA	NA	NA
Ethyl benzene	3	0.94	0.048	0.010	NA
Methylene chloride	0.002	0.0023	0.00040	NA	NA
Naphthalene	0.3	NA	NA	NA	NA
Tetrachloroethylene	1	1.6	0.18	NA	NA
Toluene	0.9	0.15	0.014	0.0033	NA
Trichloroethylene	3	3.0	0.23	NA	NA
Xylenes	0.007	0.0012	0.00027	NA	NA
Arsenic	0.03	NA	NA	NA	NA
Manganese	0.002	NA	NA	NA	NA
<b>Total HI by Pathway</b>	<b>615</b>	<b>256</b>	<b>2.1</b>	<b>0.47</b>	<b>0.064</b>

**Table 8-3**  
**Future Residential Use of Hypothetical Groundwater Well**  
**RME Cancer Risk**  
**Risk Calculated by Plume-averaging Method**  
**Record of Decision**  
**Dual Site Groundwater Operable Unit**  
**Montrose Chemical and Del Amo Superfund Sites**

CHEMICAL	BELLFLOWER B-SAND Benzene	BELLFLOWER C-SAND		GAGE AQUIFER Chlorobenzene	LYNWOOD AQUIFER Chlorobenzene
		Benzene	Chlorobenzene		
<i>Dermal Contact with Tap Water</i>					
Total DDT	NA	$7 \times 10^{-8}$	$3 \times 10^{-6}$	$1 \times 10^{-7}$	NA
Total BHC	NA	$1 \times 10^{-7}$	$2 \times 10^{-6}$	NA	NA
Benzene	$2 \times 10^{-2}$	$9 \times 10^{-3}$	$3 \times 10^{-6}$	$8 \times 10^{-7}$	NA
Carbon tetrachloride	NA	$2 \times 10^{-5}$	$4 \times 10^{-6}$	NA	NA
Chloroform	$4 \times 10^{-6}$	$5 \times 10^{-6}$	$1 \times 10^{-6}$	NA	NA
1,2-Dichloroethane	$3 \times 10^{-6}$	$3 \times 10^{-6}$	$6 \times 10^{-7}$	NA	NA
1,1-Dichloroethene	$6 \times 10^{-5}$	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	$2 \times 10^{-5}$	$2 \times 10^{-6}$	NA	NA
Methylene chloride	$3 \times 10^{-7}$	$4 \times 10^{-7}$	$8 \times 10^{-8}$	NA	NA
Tetrachloroethylene	$3 \times 10^{-4}$	$3 \times 10^{-4}$	$4 \times 10^{-5}$	NA	NA
Trichloroethylene	$8 \times 10^{-5}$	$8 \times 10^{-5}$	$7 \times 10^{-6}$	NA	NA
Vinyl Chloride*	$8 \times 10^{-5}$	NA	NA	NA	NA
Arsenic	$5 \times 10^{-6}$	NA	NA	NA	NA
<i>Total Cancer Risk by Pathway</i>	$2 \times 10^{-2}$	$9 \times 10^{-3}$	$6 \times 10^{-5}$	$9 \times 10^{-7}$	NA



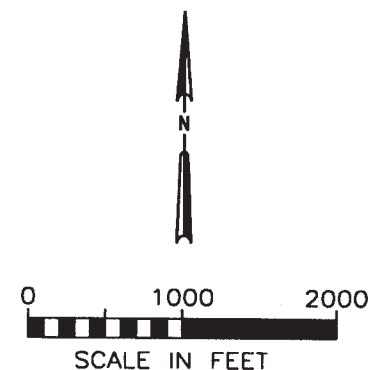
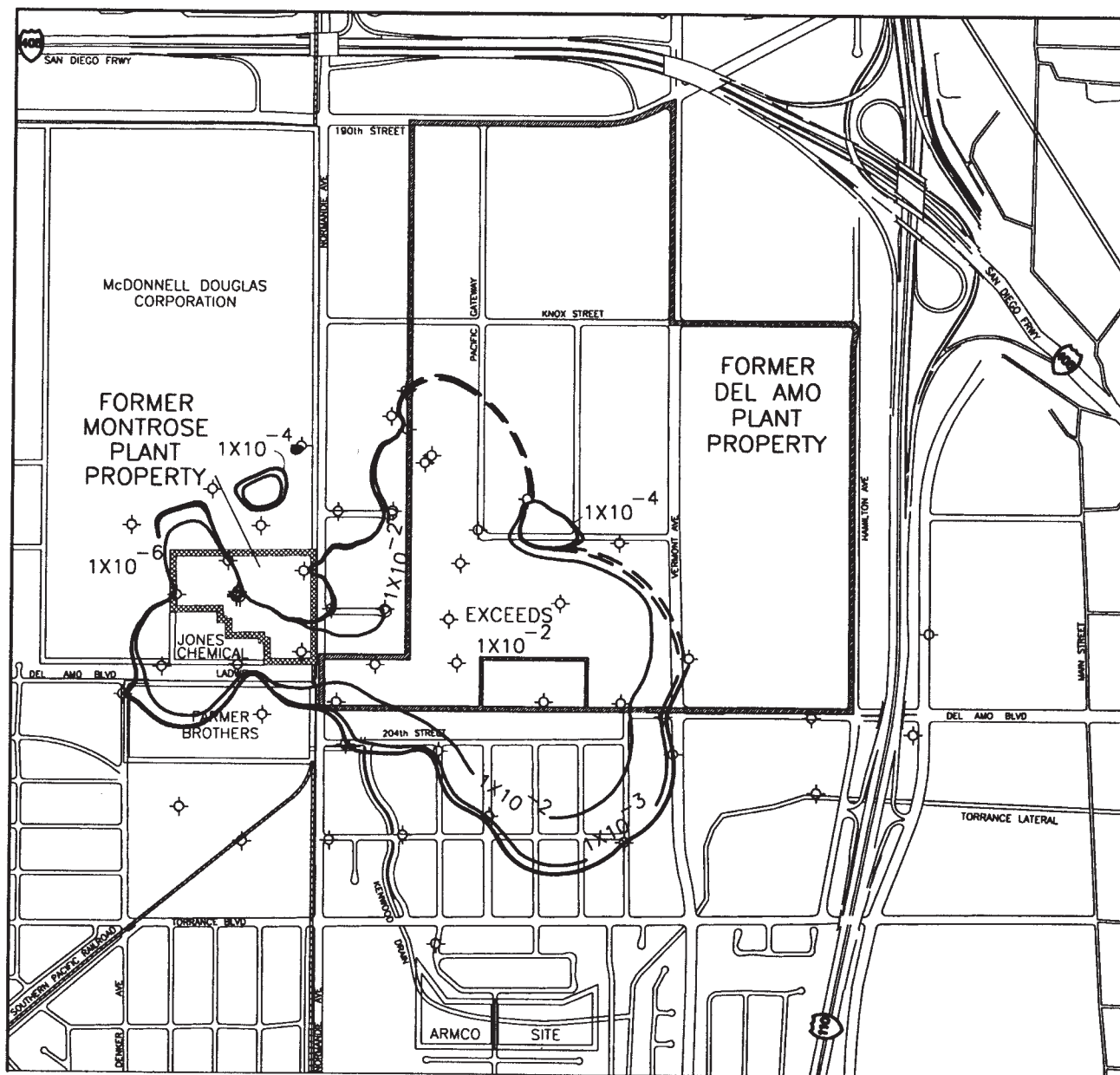
**LEGEND:**

- Well Location
- Inferred intersection of water table surface with top of middle Bellflower B sand. The overlying upper Bellflower aquitard is unsaturated west of the inferred intersection
- Risk Isopleth

**Figure 8-1a**  
 Total Excess Cancer Risk  
 Upper Bellflower Aquitard (UBF)  
 Record of Decision  
 Dual Site Groundwater Operable Unit  
 Montrose and Del Amo Superfund Sites



US EPA Region IX



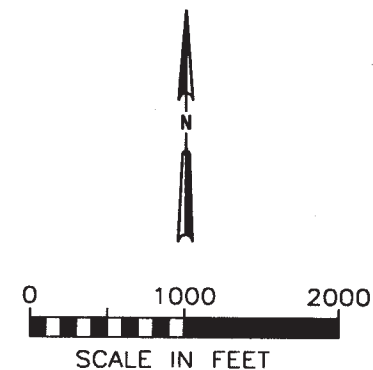
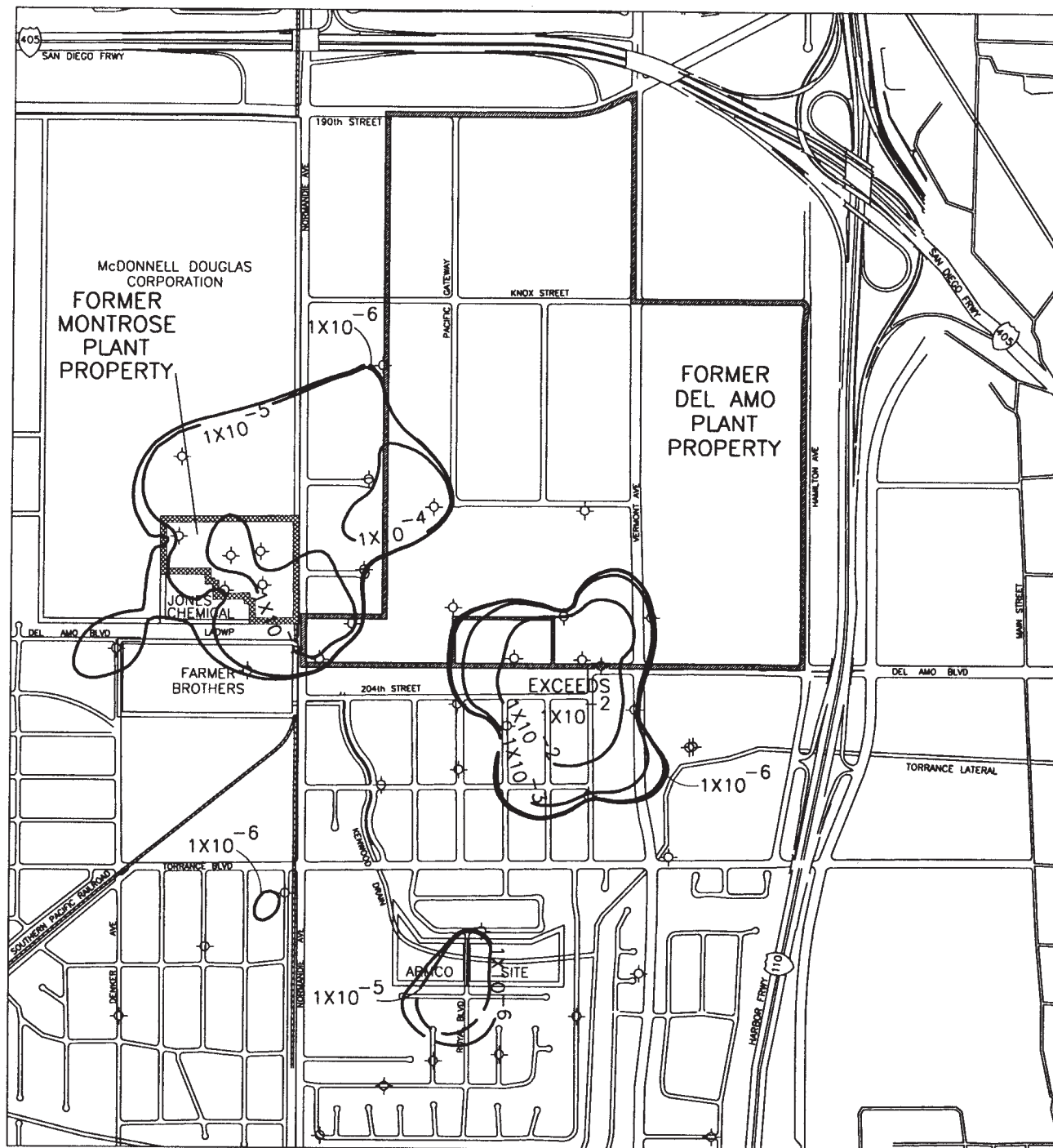
**LEGEND:**

- ⬢ Well Location
- $1 \times 10^{-2}$  Risk Isopleth
- -  $1 \times 10^{-2}$  Estimated Risk Isopleth

**Figure 8-1b**  
 Total Excess Cancer Risk  
 Middle Bellflower B Sand (MBFB Sand)  
 Record of Decision  
 Dual Site Groundwater Operable Unit  
 Montrose and Del Amo Superfund Sites



US EPA Region IX



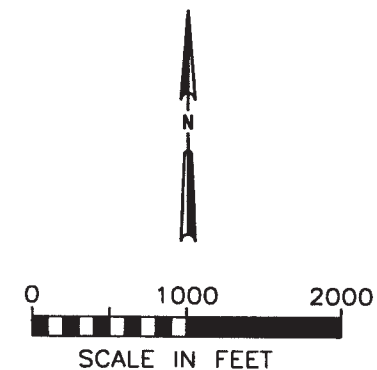
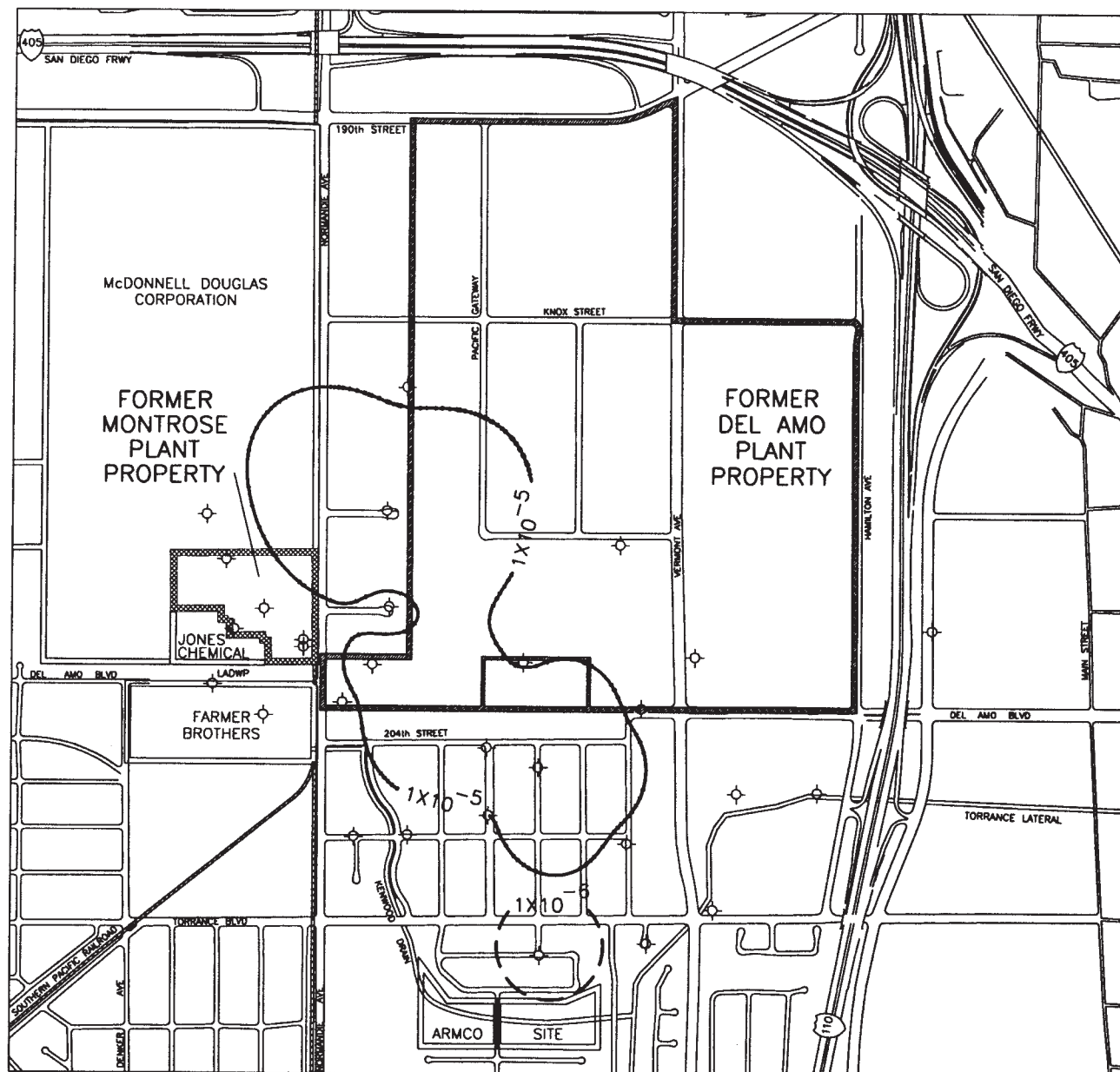
**LEGEND:**

- ★ Well Location
- 1x10<sup>-6</sup> Risk Isopleth
- - - 1x10<sup>-5</sup> Estimated Risk Isopleth

**Figure 8-1c**  
 Total Excess Cancer Risk  
 Middle Bellflower C Sand (MBFC Sand)  
 Record of Decision  
 Dual Site Groundwater Operable Unit  
 Montrose and Del Amo Superfund Sites



US EPA Region IX



**LEGEND:**

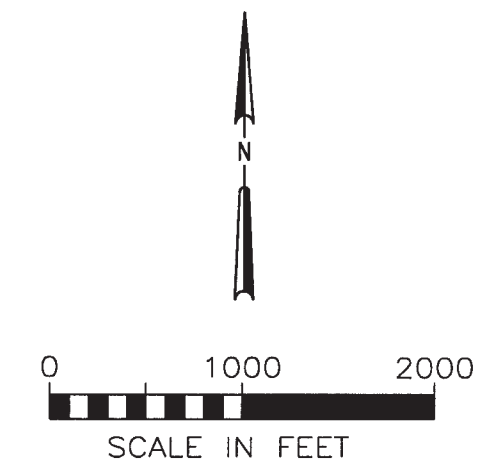
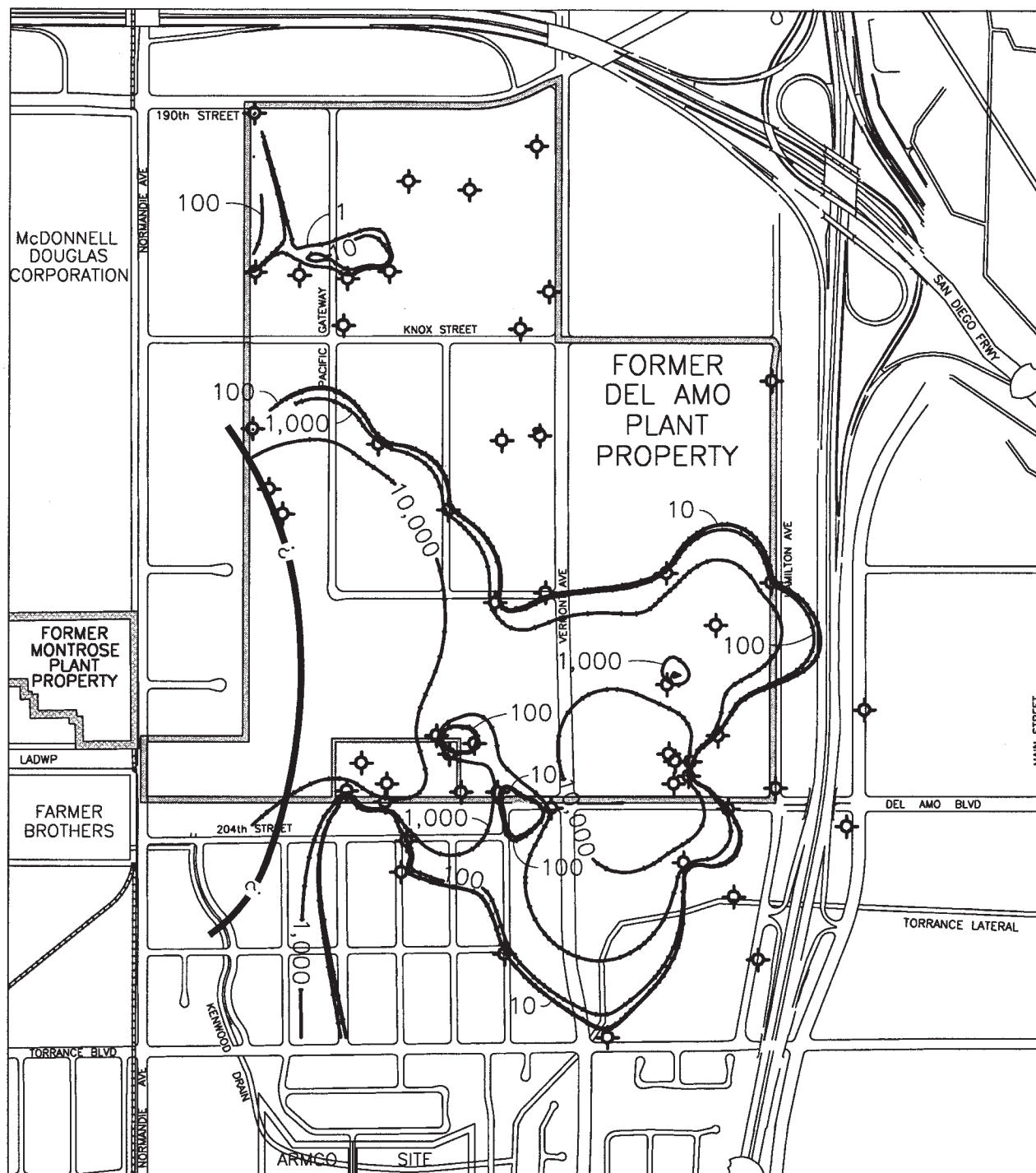
- Well Location
- Risk Isopleth
- Estimated Risk Isopleth

**Figure 8-1d**  
 Total Excess Cancer Risk  
 Gage Aquifer  
 Record of Decision  
 Dual Site Groundwater Operable Unit  
 Montrose and Del Amo Superfund Sites



US EPA Region IX





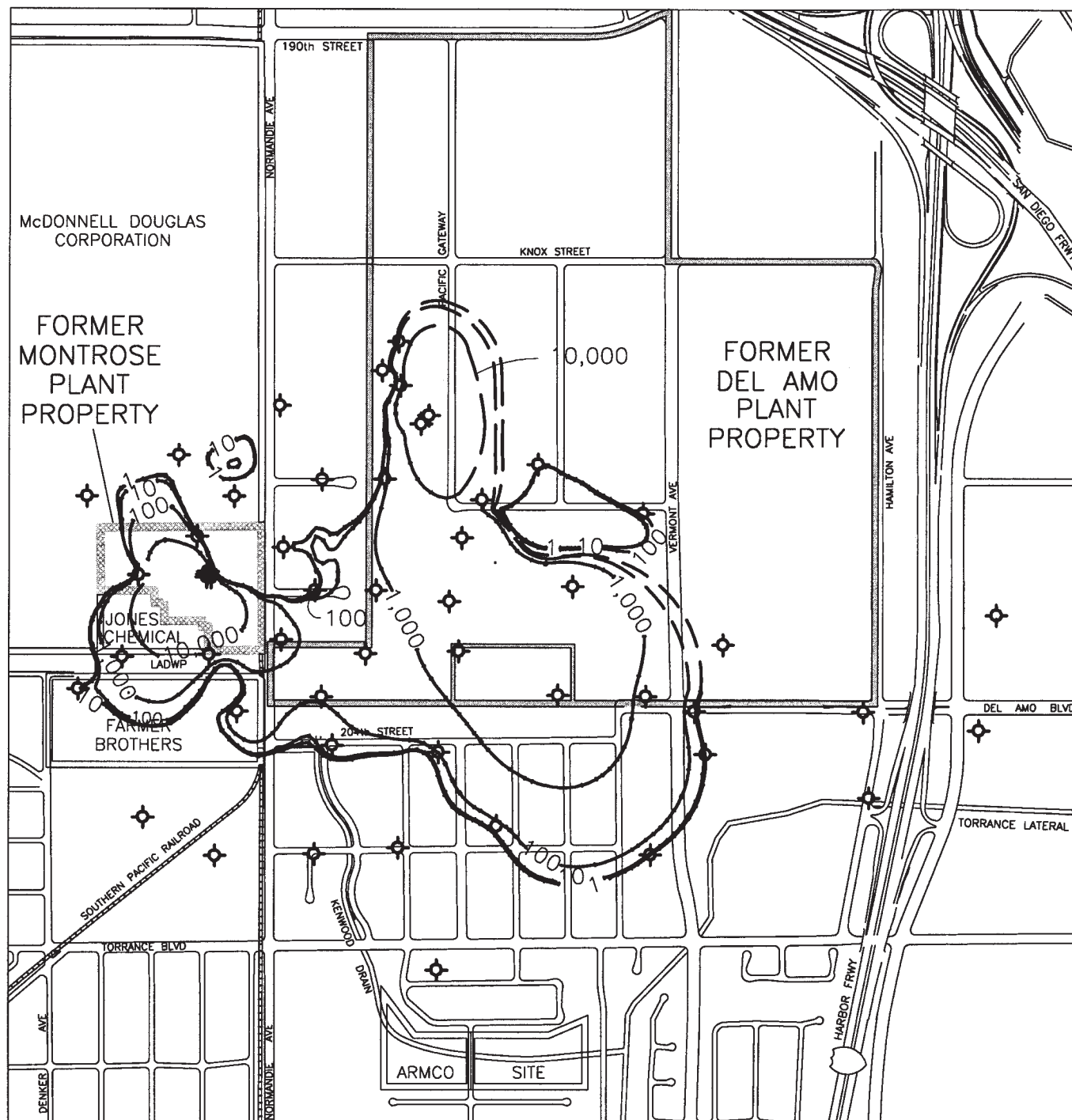
**LEGEND:**

- ⊕ Well Location
- ?— Inferred intersection of water table surface with top of middle Bellflower B sand. The overlying upper Bellflower aquitard is unsaturated west of the inferred intersection
- 1,000 HI Isopleth

**Figure 8-1e**

Montrose/Del Amo  
Total Noncancer Hazard Index  
Upper Bellflower Aquitard  
(UBF)

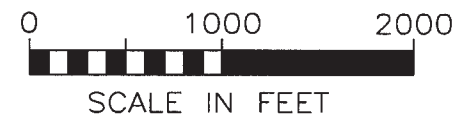
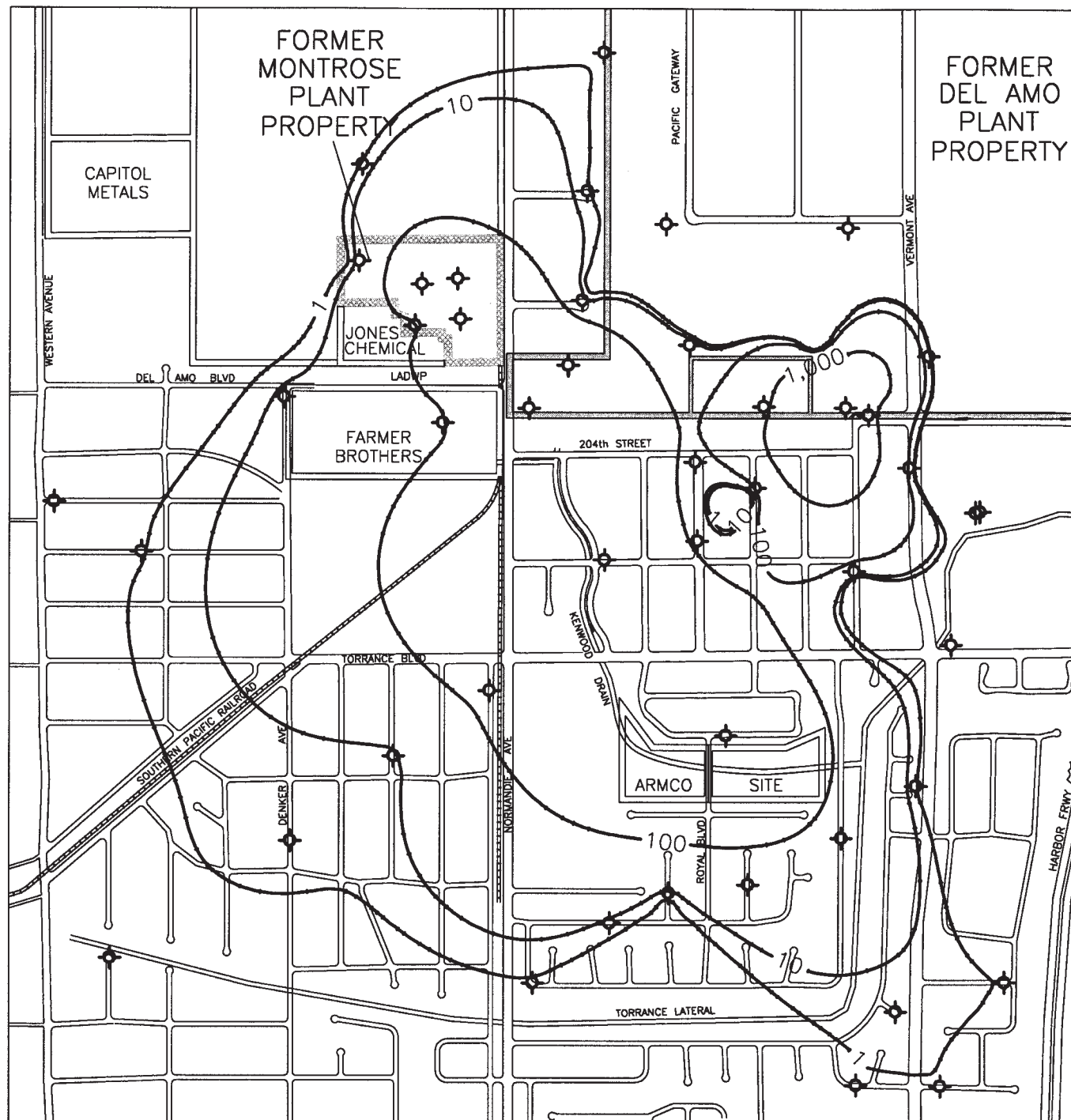
Record of Decision  
Dual Site Groundwater Operable Unit  
Montrose and Del Amo Superfund Sites





**LEGEND:**

- ⊕ Well Location
- 1,000 — HI Isopleth
- - - 10 - - Estimated HI Isopleth

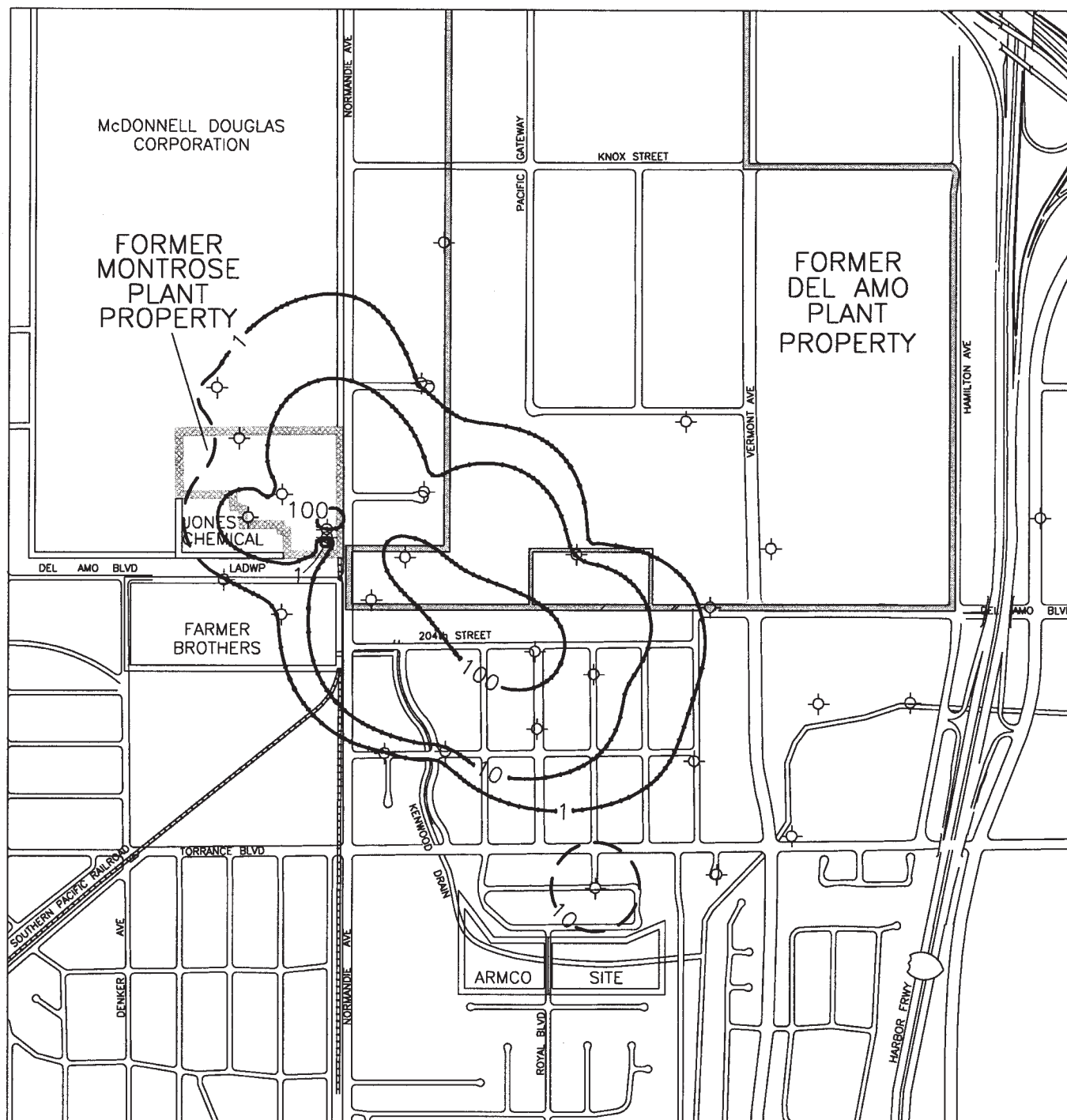
**Figure 8-1f**  
 Montrose/Del Amo  
 Total Noncancer Hazard Index  
 Middle Bellflower B Sand  
 draft  
 Record of Decision  
 Dual Site Groundwater Operable Unit  
 Montrose and Del Amo Superfund Sites



**LEGEND:**

-  Well Location
-  HI Isopleth

**Figure 8-1g**  
 Montrose/Del Amo  
 Total Noncancer Hazard Index  
 Middle Bellflower C Sand  
 Record of Decision  
 Dual Site Groundwater Operable Unit  
 Montrose and Del Amo Superfund Sites



0 1000 2000  
SCALE IN FEET

**LEGEND:**

- ⊕ Well Location
- 1000— HI Isopleth
- - -10- - - Estimated HI Isopleth

**Figure 8-1h**  
 Montrose/Del Amo  
 Total Noncancer Hazard Index  
 Gage Aquifer  
 draft  
 Record of Decision  
 Dual Site Groundwater Operable Unit  
 Montrose and Del Amo Superfund Sites